

Dr. Samuel Lee Jackson

☎ +447465943634 • ✉ s.l.jackson97@outlook.com • 🌐 samuelleejackson.co.uk

PERSONAL STATEMENT

I am a post-doctoral research associate with a focus on the study of asteroids, providing me with a wealth of experience in telescope observations of moving objects and subsequent data reduction and analysis from a variety of ground and space-based telescopes. I have over 4 years experience in the operation, maintenance, and development of autonomous robotic telescopes with the OpenScience Observatories. I am looking to expand my experience of telescope observations into new domains and contribute to keeping the space environment safe and secure for the future.

EXPERIENCE

The Open University

Post-Doctoral Research Associate (Asteroid Surfaces)

Milton Keynes

2023 - present

- Evaluating the presence of porous boulders versus fine-grained regolith on asteroid surfaces
- Deriving surface temperature distributions using a thermal model (written using C++/CUDA) for comparison to infrared observations from space-based observatories
- Robotic telescope observations to determine asteroid physical properties
- Contributing to ESA's Hera mission and NASA's Lucy mission through the development of thermal models for their targeted asteroid systems

University of Edinburgh

Post-Doctoral Research Associate (Part-Time, 6 month contract)

Remote

2022 - 2023

- Conducted observations with a small portable telescope at the Turkana Basin Institute, Ileret, Kenya at the time of impact of NASA's DART mission into the moon of the binary asteroid 65803 Didymos
- Analysed over thousands of images collected on impact night to measure the velocity and direction of a vapour plume emitted from the system immediately after the spacecraft impact (using Python for image and data analysis)
- Contributed ideas and user perspectives on a project aiming to develop the first permanent optical telescope in Kenya, using our portable system as a pilot project
- Conducted observing runs at the 2.5 metre Isaac Newton Telescope supporting data collection for a range of projects

The Open University

Emergency Support Astronomer/Observatory Software Consultant

Milton Keynes

2019 - 2022 (Multiple Contracts)

- Responsible for ensuring safe operation of two robotic telescopes during remote student use by Open University and University of Edinburgh students
- Provided on-call emergency support and remote maintenance during observing nights to ensure maximum availability for students
- Provided training to students and university staff on the operation and troubleshooting of observatory systems
- Developed scripts to ensure optimal online delivery of pre-processed telescope data to students (using Bash scripts and interfacing with tools such as astrometry.net)
- Wrote documentation on telescope operational and maintenance procedures to ensure swift recovery of systems in the event of errors through clear communication with on-site technicians

AWARDS AND MEMBERSHIPS

- Member of the ESA Hera mission investigation team (2023 - present)
- Asteroid 30226 Samuelleejackson (2000 GY137) named in recognition of my work in planetary astronomy and robotic telescope observations (2023)
- Member of the NASA DART mission investigation team (2022 - 2023)
- Rotary Prize for the Faculty of Sciences, University of Kent (2019)
- Dean's Prize for the Faculty of Sciences, University of Kent (2018)
- Fellow of the Royal Astronomical Society (2018 - Current)

EDUCATION

PhD (Astronomy & Planetary Science)

The Open University

Milton Keynes

2019 - 2023

Thesis Title: Characterising Asteroid Spin and Surface Properties using Small-Aperture Telescopes

- Collected over 1,000 hours of observations with the OpenScience Observatories to determine physical properties of 18 asteroids
- Characterised camera and whole-system behaviour through long-term studies of calibration and science frames, reducing noise in the final calibrated images and optimising data collection strategy to avoid mechanical issues such as wind-shake
- Evaluated the ability of small telescopes to contribute high-quality data of faint, moving targets such as asteroids
- Investigated the viewing geometry dependence in near-Earth asteroid phase curves, assessing how this systematic uncertainty propagates through to further study of these objects
- Performed remote and on-site maintenance of the OpenScience Observatories, contributing to testing and characterisation campaigns after upgrades while liaising with hardware and software suppliers to quickly resolve issues

MPhys (Astronomy, Space Science, and Astrophysics - First Class Honours)

University of Kent

Canterbury

2015 - 2019

Dissertation Title: Asteroid (1917) Cuyo: The Formation of a Binary Asteroid System?

- Processing of data from telescopes around the world to validate the presence of long-term changes in the spin-state of a target asteroid
- Participated in observing evenings using the robotic Beacon Observatory, gaining familiarity with telescope control software such as MaxIm DL
- Modules covering astronomical data analysis, spacecraft systems engineering, astrophysics and numerical methods

GCSE & A-Level Education

Westcliff High School for Boys

Westcliff-on-Sea

2008 - 2015

KEY SKILLS

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| ○ Programming: Python, C++, CUDA | ○ Data analysis and statistics |
| ○ Bash & Powershell scripting | ○ Public speaking across a wide range of audiences |
| ○ Operating systems: Linux, Windows | ○ Writing technical documentation |
| ○ Telescope operations, troubleshooting and maintenance | ○ Collaboration as part of small and large international teams |
| ○ Astronomical observations | |

PEER-REVIEWED PUBLICATIONS

- **Jackson, S. L.**, Kolb, U. C., & Green, S. F. (2021). Asteroid Photometry with PIRATE: Optimizations and Techniques for Small-Aperture Telescopes. *PASP*, 133, 075003
- **Jackson, S. L.**, Rozitis, B., Dover, L. R., Green, S. F., Kolb, U. C., Andrews, A. E., & Lowry, S. C. (2022). The Effect of Aspect Changes on Near-Earth Asteroid Phase Curves. *MNRAS*, 513(2), 3076
- Dover, L., Lowry, S. C., Rožek, A., Rozitis, B., **Jackson, S. L.**, et al. (2023). Physical Modelling of Near-Earth Asteroid (23187) 2000 PN9 with Ground-Based Optical and Radar Observations. *MNRAS*, 525(3), 4581

REFERENCES

References/referee contact details available on request.